MiniPAT
User Guide

Wildlife Computers

Innovative Tags for Innovative Research

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Table of Contents

INTRODUCTION **5**

OVERVIEW OF MINIPAT FUNCTIONALITY **6**

OPERATIONAL MODES 6
SENSORS 6
MEMORY 7
DATA COLLECTION (SAMPLING) INTERVALS 7
ON-BOARD DATA PROCESSING 7
DECODING THE DATA 7
A WORD ON VERSION NUMBERS 7
COMMUNICATION WITH THE MINIPAT 8

DEPLOYMENT IN BRIEF **9**

SETTING UP COMMUNICATIONS 9
SETTING UP THE TAG 9
MINIPAT MODES 9
Determining a MiniPAT's mode 9
Changing a MiniPAT's mode 9
Standby to Deploy 9
Deploy to Standby 9
Shutdown to Deploy or Standby 10
Deploy or Standby to Shutdown 10
VERIFYING MODE PRIOR TO DEPLOYMENT 10
SEALING THE COMMUNICATIONS PORT 10
ADDITIONAL DEPLOYMENT RECOMMENDATIONS 10

RECOVERY IN BRIEF **11**

BASIC RECOVERY INFORMATION 11
PREPARATION FOR POST-DEPLOYMENT COMMUNICATION 11
DOWNLOAD YOUR DATA 11

STORING MINIPAT TAGS **12**

TESTING AFTER STORAGE **12**

PREPARING TO RUN MINIPAT HOST ON YOUR PC **13**

CONFIGURATION OF USB-BLUE COMMUNICATIONS HARDWARE 13
INSTALLING MINIPAT HOST 13
HOST VERSION NUMBER 13
COMMUNICATIONS CONNECTION BETWEEN THE MINIPAT AND YOUR PC 13

CONNECTING TO THE MINIPAT **14**

MINIPAT HOST-TO-TAG TREE VIEW COMMANDS **15**

UNATTENDED TRANSMITTER TEST **16**

GENERAL TAB 17
Tag Identification 17
Argos PTT 18
TEST TAB 19
Set Tag's Date and Time 19
Sensor Readings 20
Test Transmission 20
DATA TO TRANSMIT TAB 21

MINIPAT TIME-SERIES DATA **21**

Typical Time-Series Data Settings....22
Summary Messages....24
Total Argos Messages Created....26
WHEN TO RELEASE TAB....28
Release Date....28
Conditional Release Setup....29
Homing Pinger Setup....30
COPYING SET-UP PARAMETERS FROM ONE MINIPAT TO ANOTHER....31
DOWNLOAD TAB....32
Last Deployment....32
Archive Information....32
Archive Preview....33
LOGGING OFF MINIPAT AND EXITING HOST....34
CREATING A MINIPAT DEPLOYMENT RECORD....34
DISCONNECTING FROM THE MINIPAT....34
Standby mode....34
Deploy mode....34
Shutdown mode....35
CLEARING THE MINIPAT'S MEMORY....35
SAVING DATA AND SETTINGS....36
USING THE TREE VIEW....36
FILE TYPES....36
UTILIZING DATABASE OPTIONS....38
APPENDIX A. QUICK START GUIDE....39
1 SET UP TAG....39
2 DEPLOY TAG....39
3 RETRIEVE ARGOS MESSAGES (FOR TAGS HAVING AN ARGOS TRANSMITTER)....39
4 RECOVER TAG....40
5 ANALYZE DATA....40
APPENDIX B. MINIPAT POP-UP ARCHIVAL TAG....41
MINIPAT TAG DIAGRAM....41
RD1800 RELEASE DEVICE FOR MINIPAT....42
....42
CONTACT INFORMATION....43

Introduction

*See the **Quick Start Guide** in **Appendix A** for an overview of the process that begins when you receive your new tags. From setting up the tags to analyzing the data, this brief document shows the steps you will follow. It is especially useful for those who are new to tagging.*

MiniPAT is the latest development in a line of successful Pop-Up Archival (PAT) Tags from Wildlife Computers. The MiniPAT is a sophisticated combination of archival and Argos satellite technology. It is designed to track the large-scale movements and behavior of fish and other animals which do not spend enough time at the surface to allow the use of real-time Argos satellite tags.

The MiniPAT differs from the Mk10-PAT in several ways:

- Reduced tag size, weight, and drag through the water
- Simplified set-up and data analysis
- Improved sensor performance
- Increased and optimized information that you can retrieve through Argos

To simplify the set-up and operation of the MiniPAT, the following features were not carried forward from the Mk10-PAT to the MiniPAT.

- Opportunistic transmissions
- Histogram period UTC offset

The MiniPAT has an improved RD1800 release device that is also available on the Mk10-PAT.

The MiniPAT's volume is 30% less than the Mk10-PAT to improve tag retention and deployment duration.

MiniPAT	
Volume	60 cm^3
Length	12 cm
Weight in Air	53 g
Depth Rating	2000 m

Overview of MiniPAT functionality

Operational modes

The MiniPAT has four main operational modes:

Communicating	This mode is used to configure or deploy a MiniPAT. The MiniPAT is connected via a Wildlife Computers USB-Blue communications cable interface to a PC which is running MiniPAT Host. In this mode the MiniPAT draws power from the PC through the USB-Blue.
Standby	This mode is used after configuring a MiniPAT, but before it is deployed. The MiniPAT runs in a very low power mode, and does not archive samples or transmit. It can stay in this mode for a very long time without consuming significant battery power. While in this mode the MiniPAT will be automatically deployed if it detects immersion in saltwater. It cannot be manually deployed from Standby mode using a magnet.
Deploy	In this mode, the MiniPAT actively collects data and transmits information to Argos, if configured to do so. The MiniPAT should be in this mode when attached to a study animal or other platform for an experiment. After 5 days of deployment, a magnet swipe will put the MiniPAT into Shut Down mode (this is to avoid unintentional data erasure).
Shut Down	This mode is used for long-term storage of a MiniPAT. The MiniPAT runs at the lowest-possible power and does not monitor the environment. In this mode, it will not deploy under any circumstances. It can only come out of this state if it is connected to a USB-Blue, and a magnet is passed over the reset location on the tag while MiniPAT Host is running.

Table 1

Sensors

The MiniPAT is configured with the following sensors as standard:

- Depth (sealed stainless steel and oil-filled for less zero drift)
- Internal temperature sensor for correcting drift in depth and light measurements
    - No need to be set to sample for field deployments
- External (environmental) fast-response temperature
- Two light level sensors (cleaner light measurements because MiniPAT analyzes light levels from two sensors instead of one)
- Battery voltage
    - To internally monitor performance of the battery
    - No need to be set to be sample for field deployments
- Wet/dry
    - Used by the tag to
        - detect immersion in saltwater to begin deployment
        - correct drift in depth zero offset
    - No need to be set to sample for field deployments

Memory

The MiniPAT is configured with 16 Mbytes of memory which is available for the storage of sampled data, processed data and Argos messages. The MiniPAT is able to store 3.8 million records containing light, depth, and temperature samples. Approximately 2 years of data can be stored when sampling at 15-second intervals. The memory used in the MiniPAT is Flash EEPROM, commonly found in memory sticks and camera memories. Contents of this memory are maintained even once the battery is discharged.

Data collection (sampling) intervals

Optimal sampling intervals are set automatically by Host software, based on the planned length of deployment and messages to be transmitted. The sampling intervals range from once every 1 second to once every 15 seconds. You can view the sampling interval for a particular configuration on the Pop-Up tab in MiniPAT Host.

On-board data processing

The MiniPAT onboard data processing produces traditional time-at-temperature and time-at-depth histograms, PDT profiles, and Dawn/Dusk curves (processed with SST). On-board processing also includes Time-Series data, which efficiently packs depth (and temperature, if desired) samples into Argos messages. Sample intervals can be chosen from 75 seconds to 10 minutes. Also available and exclusive to the MiniPAT is Mixed-Layer processing. Mixed-Layer data provide a daily analysis of the surface mixed layer and the time spent in this layer.

Decoding the data

In addition to MiniPAT Host, Wildlife Computers provides a suite of Data Analysis Programs (WC-DAP) available for download from our website. Using these programs you can retrieve data transmitted by your tags, view the recorded data, and export the information to various third-party analysis and presentation tools.

A word on version numbers

The MiniPAT's on-board software (tagware) can be upgraded in our lab. MiniPAT Host code is upgraded in parallel, and is generally distributed via email or our website. In order to keep the version of on-board software and MiniPAT working seamlessly together, please note the following:

- The tagware version numbers are in this format: ***x.yy***
- MiniPAT Host has version numbers in this format ***a.bb.cccc***
- When attempting to communicate with a MiniPAT tag use the following rules:
    - ***a*** must be the same as ***x***
    - ***bb*** must be greater than or equal to ***yy***
- It is best to use highest ***cccc*** available – see our website www.wildlifecomputers.com for the most up-to-date MiniPAT Host.

Communication with the MiniPAT

User parameters are programmed into the MiniPAT via a Windows-based program provided by Wildlife Computers called MiniPAT Host. MiniPAT Host must be installed on your PC. MiniPAT Host has been tested with Windows XP, Vista, and Windows 7. Earlier versions of Windows may or may not work, depending on the configuration of your PC. We do not support other operating systems (e.g., UNIX) or Windows emulators.

MiniPAT Host can be installed from our Website. Just follow the prompts.

MiniPAT Host works by:

- downloading a copy of the set-up parameters from the MiniPAT tag to the PC
- allowing you to edit these parameters in a standard Windows environment
- uploading the changed parameters back to the MiniPAT

MiniPAT Host can also save and recall configurations from templates or a database of your previous deployments.

The MiniPAT is connected to your PC via a USB-Blue cable available only from Wildlife Computers. MiniPAT Host does not support legacy serial port connections.

You should verify your communications with your MiniPAT before heading out to the field. The configuration of new computers has become more complex, and trying to debug communications issues remotely with users who are “in the field” is particularly frustrating for all concerned. There can be many bizarre interactions between various devices which are hard to track down.

Deployment in brief

Setting up communications

Follow the instructions in the detailed description of the MiniPAT Host program (beginning on page 13).

Setting up the tag

Follow the instructions in the detailed description of the MiniPAT Host program (beginning on page 17).

MiniPAT modes

In summary, a single pass of the magnet over the tag displays the mode of the MiniPAT. It takes two specifically timed passes of the magnet to change the mode.

Determining a MiniPAT's mode

A tag that is not connected to a PC may be in one of three operating states (modes). You can determine its mode by passing a magnet near the communications port while watching the LED (see Appendix B of this manual for the location of the port).

- Shutdown mode: The LED will not blink.
- Standby mode: The LED will blink twice, pause, blink twice, pause, blink twice, pause, long blink.
- Deploy mode: Ten fast blinks and then a long blink.

The LED will also indicate these conditions:

- Erasing the archive: Rapid blinks with the LED mostly on indicate that the tag is clearing the archive in preparation for a new deployment.
- Sample rate: For the first two hours of a deployment (or until the tag depth exceeds 5 meters) the tag will briefly blink at the sampling interval.

Changing a MiniPAT's mode

Standby to Deploy

- Standby changes to Deploy automatically when the tag senses immersion in saltwater.
- Alternatively you can connect the tag to a PC running MiniPAT Host, right-click on the tag's serial number and select Deploy.

Deploy to Standby

- Pass a magnet over the tag near the communications port. After the ten short blinks, it will do a long blink. Swipe the magnet again during the long blink. If you do not time the second swipe correctly, the tag it will remain in Deploy mode. See the above paragraph "Determining a Tag's Mode" to confirm the tag's current mode.
- Alternatively you can connect the tag to a PC running MiniPAT Host, right-click on the tag's serial number and select Standby.

- After 5 days of deployment, a magnet swipe will put the MiniPAT into Shut Down mode. The tag must be connected to a PC running MiniPAT Host in order to change the mode. This is to avoid unintentional data erasure.

Shutdown to Deploy or Standby

- To change a tag's mode from Shutdown the tag must be connected to a PC running MiniPAT Host and then swiped with a magnet. After it is connected to MiniPAT Host, right-click the serial number and select either Standby or Deploy.

Deploy or Standby to Shutdown

- To change a tag's mode to Shutdown, the tag must be connected to a PC running MiniPAT Host and then swiped with a magnet. After it is connected to MiniPAT Host, right-click the serial number and select Shutdown.

Verifying mode prior to deployment

You should always confirm the MiniPAT is in Standby or Deploy mode before deployment**.**

Sealing the communications port

Apply a very small amount of silicone (or vacuum) grease to the small white Teflon communication port plug. After checking the alignment of the holes, press the plug into the MiniPAT's communication port until it is firmly seated. A lost or missing plug will not interfere with deployment. The communications port is already sealed to prevent water intrusion. The plug is intended to keep the port clean for easier post-deployment communication, if any is required.

Additional deployment recommendations

Wildlife Computers recommends that all tags initially be set up in the lab, when there is plenty of time and conditions are at their best. Once the tags are set up, they can be placed in Standby mode until ready to use.

Since MiniPAT batteries have plenty of capacity, if the tags will be deployed within a month, they also can be set up and put into Standby mode. However, the user should then use a magnet to verify the MiniPAT is in the correct mode before deploying it on the study animal or gear.

WARNING: If you are programming MiniPAT tags, and have set the tags with conditional release parameters, it is STRONGLY recommended to leave the tags in Standby mode and not in Deploy mode to prevent accidental conditional release detection, which may burn the corrodible pin and/or start transmissions, which will drain the battery.

Recovery in brief

Basic recovery information

If the MiniPAT is recovered after deployment, it is possible that contamination of the communications port may cause some communication difficulties. The following instructions, in addition to describing how to recover the data, explain possible problems that might occur during the recovery and how to fix them. Even if all attempts to communicate with the MiniPAT fail, your deployment data are probably still in memory, and can be retrieved by Wildlife Computers.

Preparation for post-deployment communication

When you recover your MiniPAT full of valuable deployment data, there are several steps to perform before attempting to connect it to the USB-Blue.

As a precaution, it is advised to have the following on hand:

- Compressed air in a can
- Electronic contact cleaner, if available

1) Thoroughly dry the MiniPAT with a paper towel.
2) Remove the rubber communications port protection plug.
3) Blow out any water in the communication port. Make sure the port is clean and dry. Compressed air in a can works well for this. Note that communicating with a MiniPAT which has saltwater in the communications port will cause the pins to corrode very fast!
4) Count the number of pins in the communications port. If there are not four pins, one or more have corroded or broken off. Send the MiniPAT to Wildlife Computers, and we will download your data.
5) Examine the pins in the communications port. If they are rusty or corroded, send the MiniPAT back to Wildlife Computers for downloading.
6) If all four pins look clean and golden, you can continue and attempt to establish communications.
7) You may wish to spray some contact cleaner into the communications port as a precaution.

If you are able to establish a communication connection with the tag, you are now ready to download your data with the MiniPAT Host.

Download your data

Follow the instructions in the detailed description of the MiniPAT Host program. ***It is very import to save the collected deployment data in the .wch format. This is the only format that can be processed by Wildlife Computers analysis programs***.

Put your tag into Shutdown or Standby mode after downloading the data.

Storing MiniPAT tags

MiniPATs that will not be deployed for an extended period of time (more than one month) should be stored in a refrigerator or freezer (5 to -20C). This minimizes battery passivation.

Lithium batteries are designed to develop an oxide layer over their anodes to minimize self-discharging. This is called passivation. This process is exacerbated by high (30C+) temperatures. The passivation layer is “burned off” when current is drawn from the battery. Very little current is drawn from the MiniPAT when it is shutdown or in standby, so a passivation layer may form. If the passivation layer is too thick, the battery voltage may drop so low that the MiniPAT cannot function.

Testing after storage

The MiniPAT should be tested after storage, prior to deployment. It is not necessary to warm up the tag prior to testing.

Establish communication between the tag and the MiniPAT Host. Test the Argos transmitter (on the Test tab under Test Transmission) and check the battery voltage reported. It should read 3.0V or greater. The battery voltage may be a little low initially, but should increase after testing the transmitter several times. Repeat as necessary.

You can also test the sensors according to the expected values stated in the table of Sensor Readings.

Preparing to run MiniPAT Host on your PC

Configuration of USB-Blue communications hardware

Install the USB-Blue driver from either the Downloads page on WildlifeComputers.com or from the disk that was shipped with your tags. Under Device Drivers, click on USB-Blue Driver and follow the instructions.

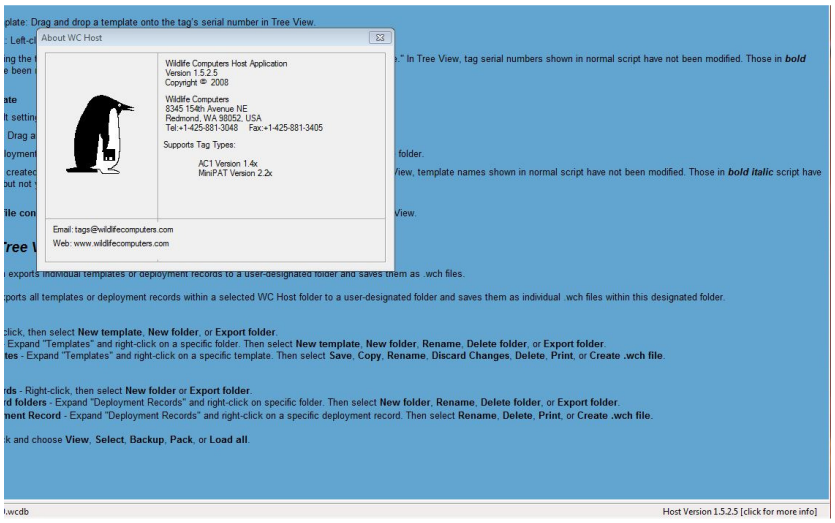
This is the same USB driver used on other Wildlife Computers tags, so if you have already installed a working USB driver for other tags you can skip this step.

Installing MiniPAT Host

MiniPAT Host is installed from the Downloads page on WildlifeComputers.com. Under Communications Software, click on MiniPAT Host and follow the instructions.

Host version number

Clicking in the lower right corner of the MiniPAT Host window will reveal detailed version information (see below).



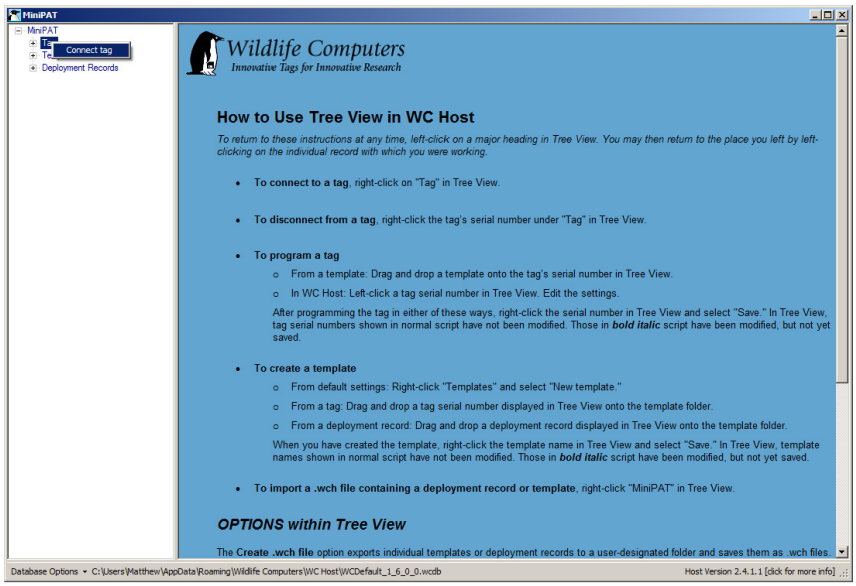
Communications connection between the MiniPAT and your PC

The communications port is a rectangular hole with chamfered edges in the epoxy casting of your tag. It contains 4 gold-plated pins. Note the orientation of the pins in the communications port. There are three pins in sequence, a “missing pin,” and a single pin. Note the orientation of the sockets in the flat plug. One of the sockets is blocked. It is important that the flat plug is correctly oriented to the pins in the communications port before inserting the plug.

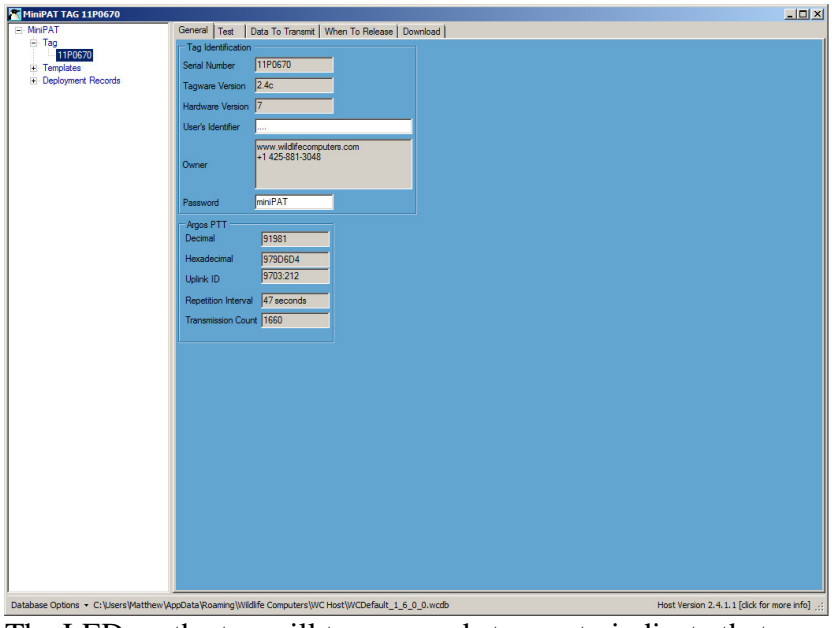
Carefully insert the flat plug from the USB-Blue into the MiniPAT’s communications port. *Do not force the plug*. The USB-Blue can be inserted into the MiniPAT at any time. Wait to unplug the MiniPAT until directed by the host software.

Connecting to the MiniPAT

Launch MiniPAT Host on your PC. Carefully insert the USB-Blue into the MiniPAT communications port. The opening screen displays instructions for using the Tree View to manage your tags and files. Under MiniPAT in the Tree View, right click "Tag" and select "Connect Tag." Alt+C is a shortcut for this step.


MiniPAT
Connect tag
Deployment Records
Wildlife Computers
Innovative Tags for Innovative Research
How to Use Tree View in WC Host
To return to these instructions at any time, left-click on a major heading in Tree View. You may then return to the place you left by left-clicking on the individual record with which you were working.
To connect to a tag, right-click on "Tag" in Tree View.
To disconnect from a tag, right-click the tag's serial number under "Tag" in Tree View.
To program a tag
From a template: Drag and drop a template onto the tag's serial number in Tree View.
In WC Host: Left-click a tag serial number in Tree View. Edit the settings.
After programming the tag in either of these ways, right-click the serial number in Tree View and select "Save." In Tree View, tag serial numbers shown in normal script have not been modified. Those in bold italic script have been modified, but not yet saved.
To create a template
From default settings: Right-click "Templates" and select "New template."
From a tag: Drag and drop a tag serial number displayed in Tree View onto the template folder.
From a deployment record: Drag and drop a deployment record displayed in Tree View onto the template folder.
When you have created the template, right-click the template name in Tree View and select "Save." In Tree View, template names shown in normal script have not been modified. Those in bold italic script have been modified, but not yet saved.
To import a .wch file containing a deployment record or template, right-click "MiniPAT" in Tree View.
OPTIONS within Tree View
The Create .wch file option exports individual templates or deployment records to a user-designated folder and saves them as .wch files.
Database Options
C:\Users\Matthew\AppData\Roaming\Wildlife Computers\WC Host\WCDefault_1_6_0_0.wcdb
Host Version 2.4.1.1 [click for more info]

Follow the instructions until the tag's serial number appears in the Tree View under "Tag" as shown in the screen below.



The LED on the tag will turn on and stay on to indicate that you have a good connection to Host.

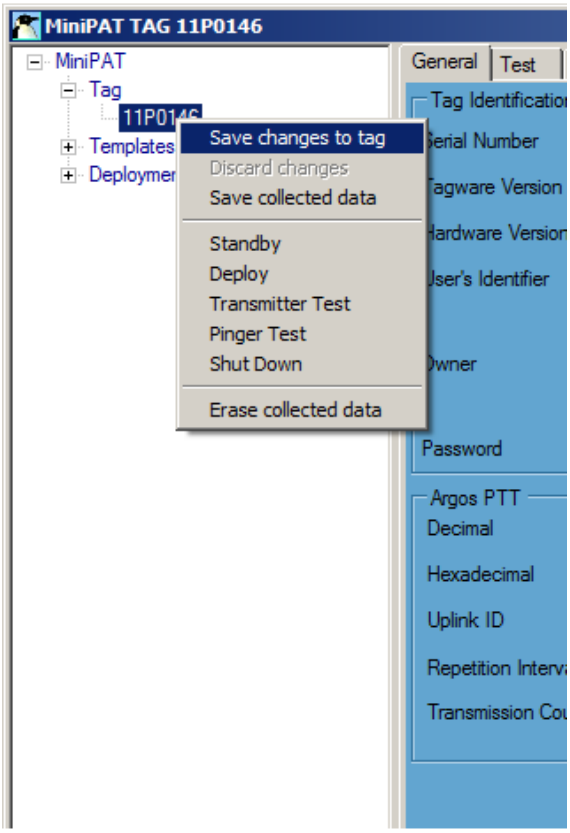
Warning: If the MiniPAT has important data from a deployment that have not been downloaded, follow instructions in the section on the Download Tab on page 21 before changing any parameters.

MiniPAT Host-to-tag Tree View commands

Right clicking on the MiniPAT's serial number in the Tree View brings up several options you may select.

Those options are:

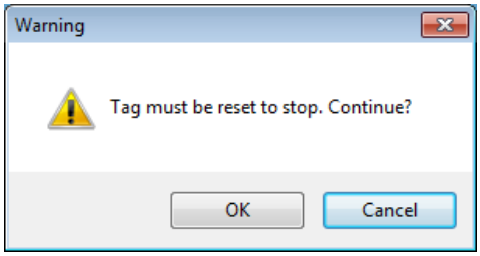
- ***Save changes to tag*** - Changes made in the MiniPAT Host session are not saved to the MiniPAT tag until you select this option. Selecting this will update the tag with the parameters selected during the current Host session.
- ***Discard changes*** - This discards changes made in the current MiniPAT Host session, resets the MiniPAT Host to the parameters that were read in from the tag when it was connected. Selecting this option does not update the parameters on the MiniPAT tag.
- ***Save collected data*** - This saves the data downloaded from the MiniPAT tag during the current MiniPAT Host session to a user-specified file location.
- ***Standby*** - Puts the connected MiniPAT tag into Standby mode.
- ***Deploy*** - Puts the connected MiniPAT tag into Deploy mode.
- ***Transmitter Test*** - This is an unattended transmission test, which sends a user-specified number of test transmissions to the satellites.
- ***Pinger Test*** - Tests the pinger. See Pop-Up Tab section.
- ***Shutdown*** - Puts the connected MiniPAT tag into Shutdown mode.
- ***Erase collected data*** - Clears data from the memory of the MiniPAT.



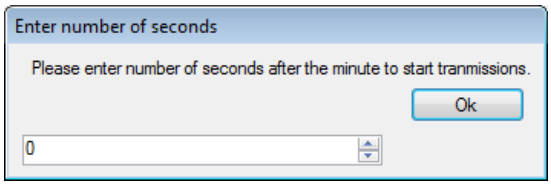
Unattended transmitter test

There are two kinds of transmitter tests that you may perform on your MiniPAT. First is an unattended test that you set up by right-clicking on the serial number of the tag in the Tree View and selecting the parameters as shown below. This unattended test will transmit to the satellites and produce Argos test data which can be retrieved to verify that the MiniPAT is transmitting properly.

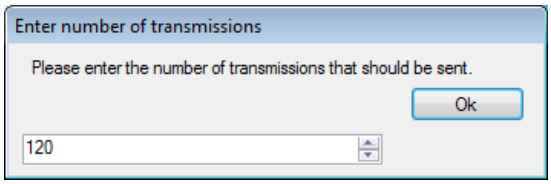
Additionally, the Test Tab in MiniPAT Host has a button to select which performs a single transmission, and which you can execute at any time that you are connected to the MiniPAT. This is explained in the manual in the "Programming and Testing the MiniPAT" section.



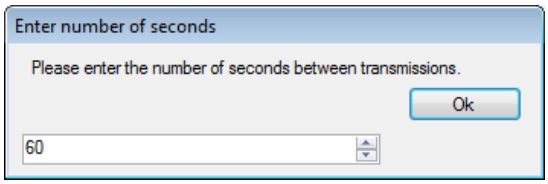
You must select OK to continue with the unattended test.



If you will be testing several tags at one time, you can use this parameter to offset transmissions so they will not be transmitting on top of one another.

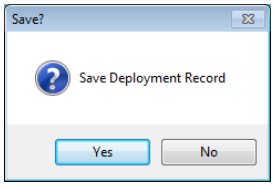


120 transmissions will provide a 2-hour test, which is usually enough to coincide with a couple of satellite passes.



The usual repetition rate for a MiniPAT is 60 seconds. That is the minimum number to select.

The green "success" progress bar on the screen indicates that the command went from MiniPAT Host to the tag and is being executed.

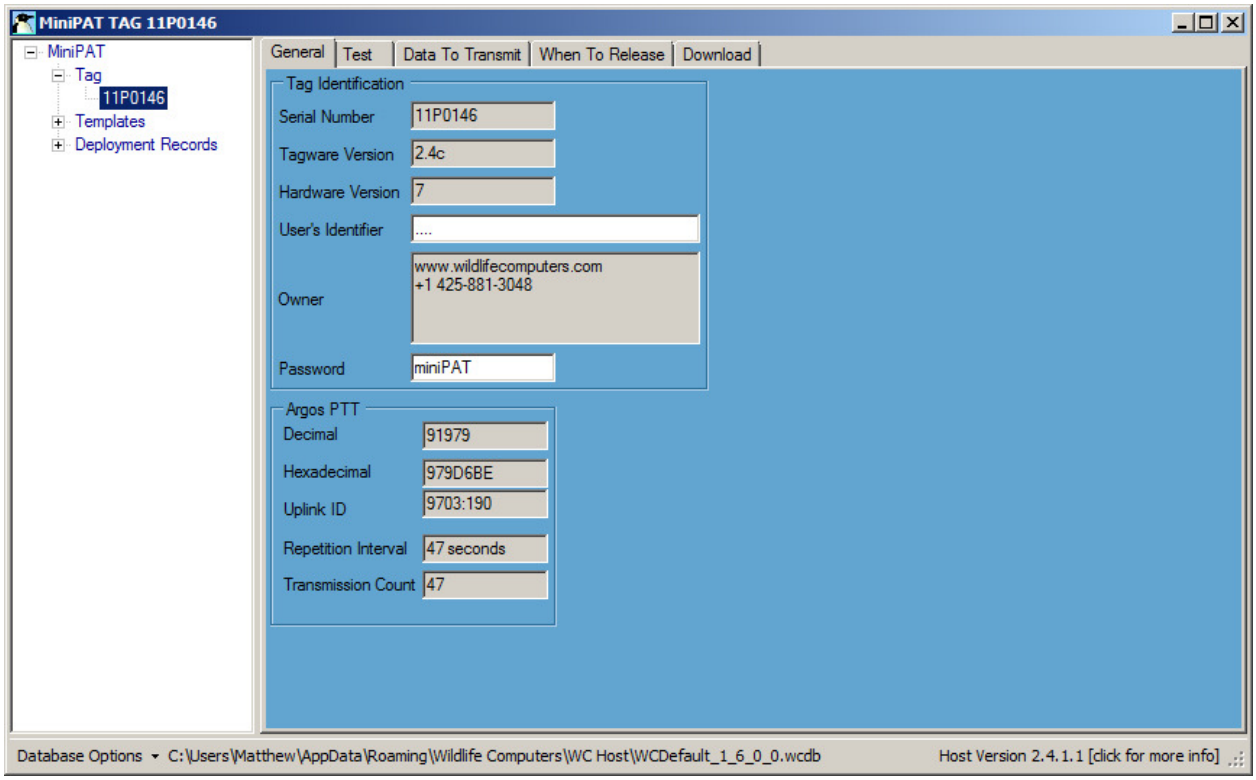


You will be asked whether or not to save the Deployment Record. Choose whichever applies to your situation.

To stop the transmission test prior to the completion of parameters you set, connect to the MiniPAT again and re-establish Host communications with the tag.

Programming and testing the MiniPAT

General Tab



Tag Identification

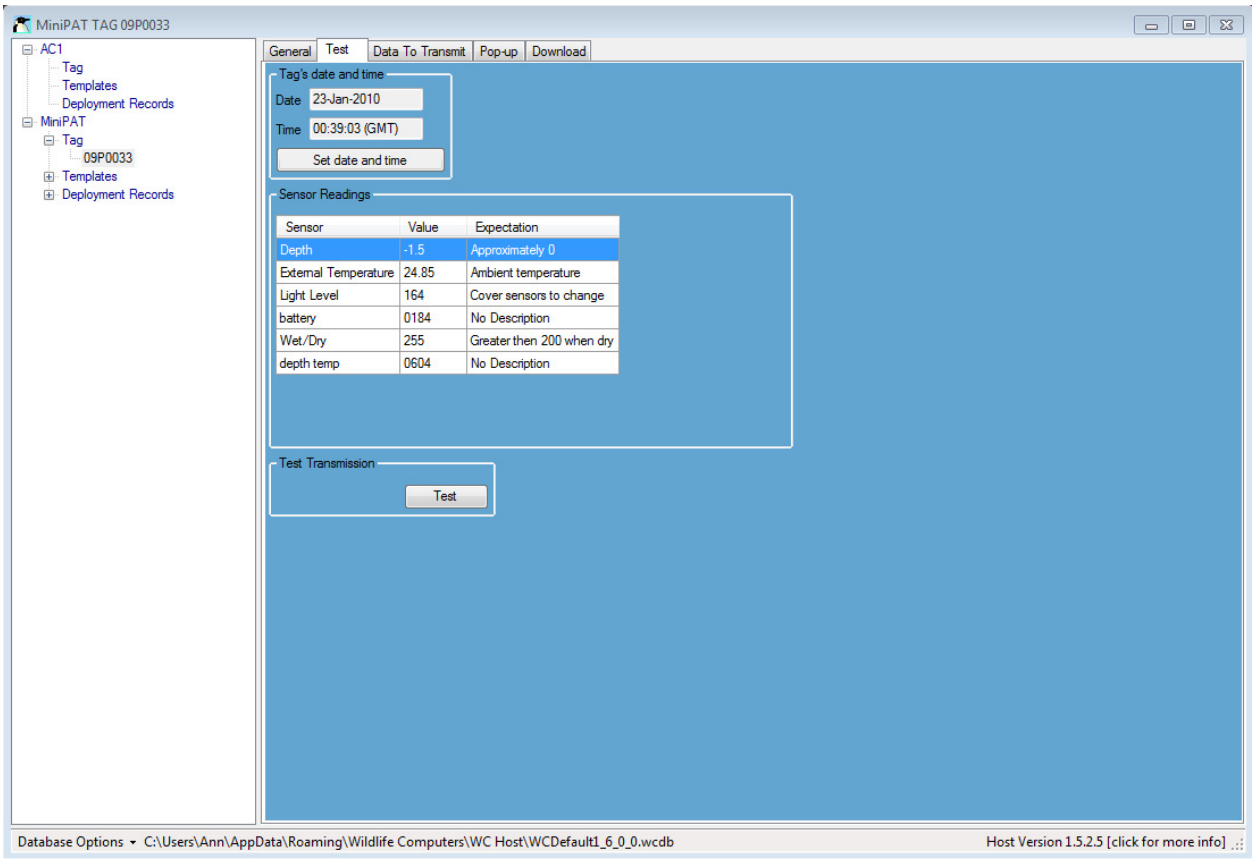
- **Serial Number:** The serial number is a unique identifier of the physical tag. It was set by Wildlife Computers and never changes. The first two digits indicate the year that the tag was manufactured.
- **Tagware Version:** This identifies the version of the software that is installed on the tag. The tagware is upgradeable by Wildlife Computers in our lab. If it has been a while since you received your tags, you may want to contact us to see if upgrades to your tagware are available.
- **Hardware Version:** This identifies the version of electronics inside the tag. This is set by Wildlife Computers and it does not change.
- **User's Identifier:** This 16-character field allows you to enter an identifier that will remain with the tag. It is also saved in the archive files that are downloaded from the tag. It is intended for your own use to distinguish between your different tags. You can change the User's Identifier by connecting to the tag in Host, changing this field and then right-clicking on the serial number for this tag in the Tree View to select "Save changes to tag."

- **Owner:** This field was filled in by Wildlife Computers with information about the owner as supplied by the purchaser of the tag. This field can only be changed by Wildlife Computers.
- **Password:** The password for a new MiniPAT is set to the default "miniPAT". When the password is set to the default, you can connect to the tag in MiniPAT Host without being prompted for a password. Most situations do not require changing this to a custom password. However, if needed, you can change it to a custom password (up to 8 characters) and save it to the tag. After saving a custom password to a tag, the only way to connect to the tag is to remember your password. If you forget your password you will have to send the tag back to Wildlife Computers to have the password reset.

Argos PTT

- **Decimal**: This is a unique number assigned by Argos. It is used when downloading data from Argos. This can only be changed by returning the tag to Wildlife Computers.
- **Hexadecimal:** This is a unique number assigned by Argos that is included as part of all Argos transmissions. This can only be changed by returning the tag to Wildlife Computers.
- **Uplink ID:** This is an abbreviated form of the Hexadecimal PTT. This number will appear on an uplink receiver when the tag transmits.
- **Repetition Interval**: This indicates how often a tag will test for dry conditions and try to transmit after pop-off. This value is assigned by CLS (Argos) and set by Wildlife Computers.

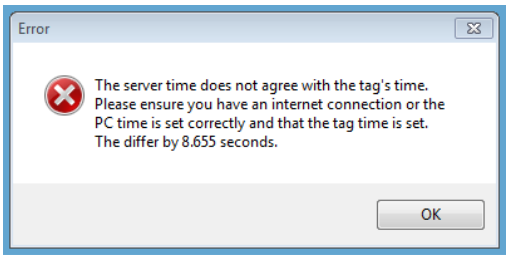
Test Tab



The Test Tab only appears when you are connected to and viewing a tag. You will not see this tab if you are viewing a template or deployment record. Use the Tree View on the left side of the screen to select objects for viewing. The title bar at the top of the screen indicates which tag template or deployment record is being displayed.

Set Tag's Date and Time

- **Date, Time:** These fields, which indicate the readings for the tag's onboard clock, are continuously updated while the Test tab is selected. The LED on the tag may blink as a result of these updates.
- **Set date and time:** Use this command to set the tag's onboard clock from a known reliable Internet server or from manually-entered values. If the Host discovers a discrepancy, you will receive a warning notice (see below).


Error
The server time does not agree with the tag's time.
Please ensure you have an internet connection or the
PC time is set correctly and that the tag time is set.
The differ by 8.655 seconds.
OK

Sensor Readings

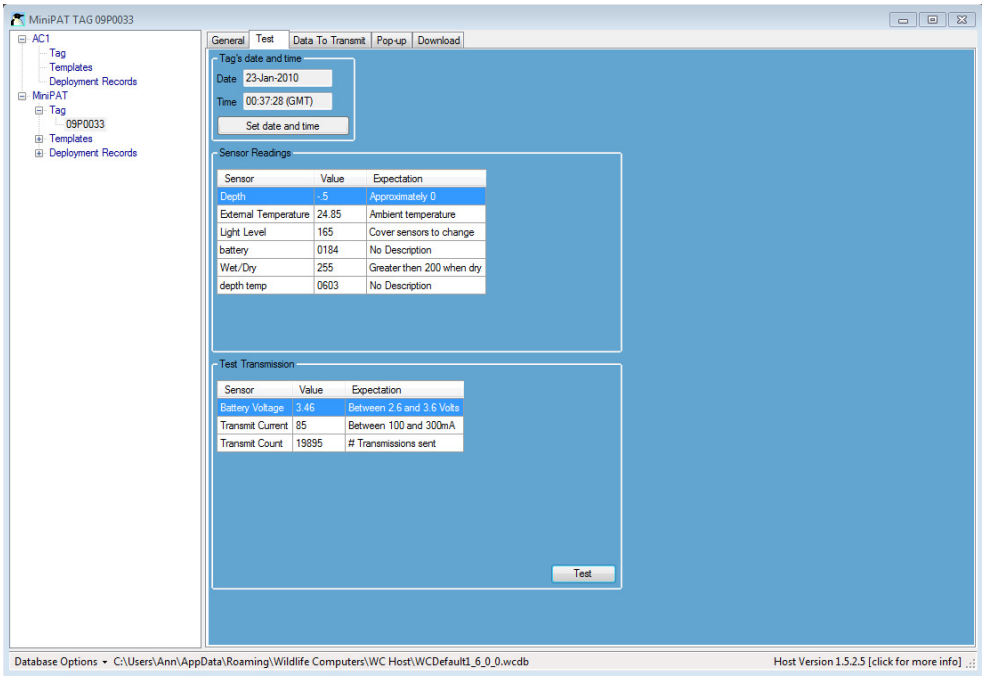
The sensor values are continuously updated from the tag. Note: Defective sensors typically have values far outside of the expectation. If you have a reason to suspect a sensor has a problem, you can do the following to verify sensor functionality.

- **External Temperature:** This value responds quickly to warm air blown onto the thermistor located immediately above the communications port.
- **Light Level:** Under typical office lighting, covering both light sensors (shiny squares on opposite sides of the tag) with your fingers should drop the value by 20 to 40 counts.
- **Wet/Dry:** Connecting a wire from the large rectangular ground plate strap above the communication port to the metal ring around the base of the antenna should change the value from over 200 to less than 20.
- **Internal Temperature:** This will change slowly as the entire tag changes temperature. Leaving the tag in a refrigerator for a while will change the value.

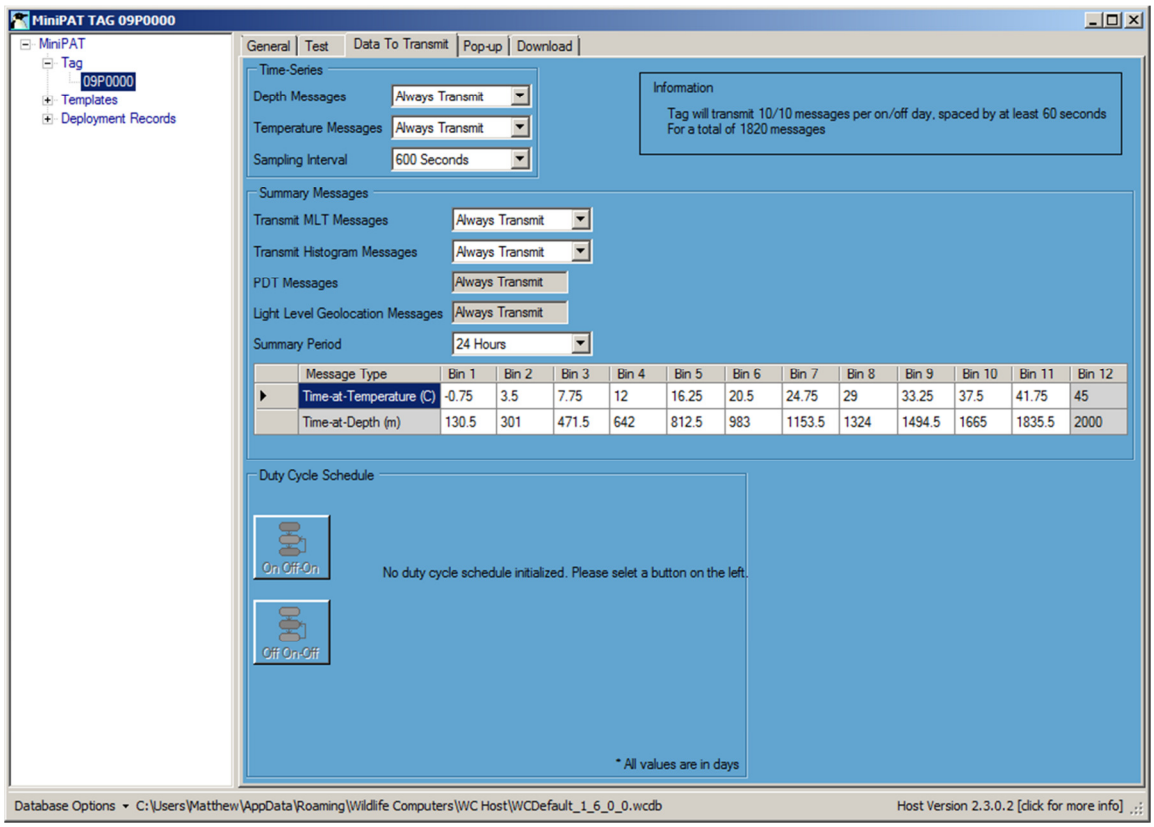
Test Transmission

Clicking the Test button transmits one test message from the tag. A table of transmission values appears when you click on the Test button. The table updates its values with each test transmission.

- Battery Voltage: This battery voltage will be lower than in the table of Sensor Readings because it is measured when the battery is driving a transmission.
- Transmit Current: The transmit current will vary depending on the presence of conductive objects near the tag. It has been optimized for a tag that is floating in saltwater.
- Transmit Count: The number of transmissions since the tag was manufactured.



Data To Transmit Tab



MiniPAT Time-Series Data

MiniPAT tags have the ability to send time series depth and/or temperature data through Argos. This feature is designed to provide low-frequency reporting of sensor data for instruments which may never be recovered.

One of five time series sample intervals can be chosen and this determines the number of Argos messages generated per day. **This time series sample interval is entirely independent of and unrelated to the archive sample rate.** 48 summarized samples, covering one Message Period, will fit into 1 Argos message. Messages are transmitted in sequential order to maximize the probability of receiving continuous runs of data.

Sample Interval (minutes)	**Argos Messages Per Day**		**Message Period (hours)**
	Depth *or* Temp (1 channel)	**Depth *and* Temp (2 channels)**	
1 ¼	24	48	1
2 ½	12	24	2
5	6	12	4
7 ½	4	8	6
10	3	6	8

Selecting a short (75-second) Time-Series sampling interval rapidly generates many messages. This might be acceptable for a short deployment. However if too many messages are generated, the tag will be unable to transmit all of them. The result will be random gaps of time during the deployment for which there is no time-series data. Selecting a longer sampling interval will improve the odds that there will be no gaps in your Time-Series data set. However, the temporal resolution of each datum will be reduced. Different study objectives will warrant different trade-offs between coverage and temporal resolution.

Each time series message contains:

- 48 instantaneous points sampled at the specified sample interval for that message period.
- The minimum and maximum values encountered during the message period for the channel which are determined from all archived values in that message period.

Note that the absolute Min/Max values and point sample values may not match as the Min/Max value is determined from all archived data during the message period.

As described below in this document, three duty cycling parameters are available to control the time series data generation. Duty-cycle settings do not affect the tags archive sample rates or Argos transmission settings.

Typical Time-Series Data Settings.

As explained above, the sample interval determines the Message Period and is related to the number of messages that can be transmitted. For a MiniPAT tag, approximately 2000 Argos messages are received following release. Therefore the sample interval must be set to match the deployment duration before release. Duty-cycling can be used to reduce the number of messages and extend the duration.

Typical examples are:

1 month deployment = 75 second sampling interval for depth and temp time series.
48 messages per day x 30 days = 1440 messages.

3 month deployment = 300 second sampling interval for depth and temp time series.
12 messages per day x 90 days = 1080 messages.

8 month deployment = 600 second sampling interval for depth and temp time series.
6 messages per day x 240 days = 1440 messages.

Time-Series Data presentation.

Time-Series Data are presented in SeriesRange.csv and Series.csv files as produced by Wildlife Computers Data Analysis Program 3 (DAP3). See the DAP3 user-guide for full details on available .csv output files.

Time-Series Parameter Configuration

Care should be taken in configuring parameters to take full advantage of the capability of the tag. The settings that you choose on this tab will significantly affect the usefulness of the information received from Argos messages.

- **Depth Messages:** An Argos Time-Series can be set to always transmit, disabled, or duty cycled. Data decoded from the Argos message will contain a time, sampled depth, resolution of the depth, and a minimum and maximum depth for an interval 48 times the selected sampling interval. Duty cycling is addressed below.

- **Temperature Messages:** An Argos Temperature-Series can be set to always transmit, disabled, or duty cycled. As with dive time series messages, resulting data will contain a sampled temperature, resolution of the temperature, and a minimum and maximum temperature for a multiple of the sample interval (48 times). Selecting both depth and time series messages will double the number of messages required to transmit a complete Time-Series data set. Duty cycling is addressed below.
- **Sampling Interval**: This defines the interval between depth and temperature samples. Sample interval and several other setting should be considered together to get the most value from the information that can be transmitted using Argos. These settings are discussed in "*Total Argos Messages Created."*
- **Time-Series Sensor Resolution**: In addition to compressing raw archive data in the time dimension there is also a need to reduce the resolution of sensor measurements. MiniPAT tagware optimizes the compression of the sensor resolution so you do not need to configure anything on your tag. However analyzing data received through Argos requires an understanding of how sensor data was compressed into Argos messages.

  Each sensor within each message has a single resolution applied to all of its measurements. Different sensors within the same message can have different resolutions. Tagware analyzes a sensor's data for the message period (one hour in the example) and chooses an optimal resolution for that hour. This means that the resolution will vary from message to message. The disadvantage of this is some added complexity, that is, your time series will have different resolutions during different periods of time. However the benefit is a highly-optimized compression giving you the best possible resolution from a limited number of Argos messages.

  Tagware chooses a resolution for a message packet by looking at all of the raw archive samples that were taken during the 48-interval period, finding the min and max sensor values, and then applying that range to all of the values for that sensor in that message. The message packet will include these min and max values. It should be noted that these min and max values are picked from the rapidly-sampled raw archive values and not the sub-sampled Time-Series Sampling Interval values. This means that you will always get the true min and max sensor values that were sampled by the tag during that message period.

  Note: Time-Series messages are automatically enabled if a MiniPAT senses an exceptionally short conditional release. See Conditional Release Section.

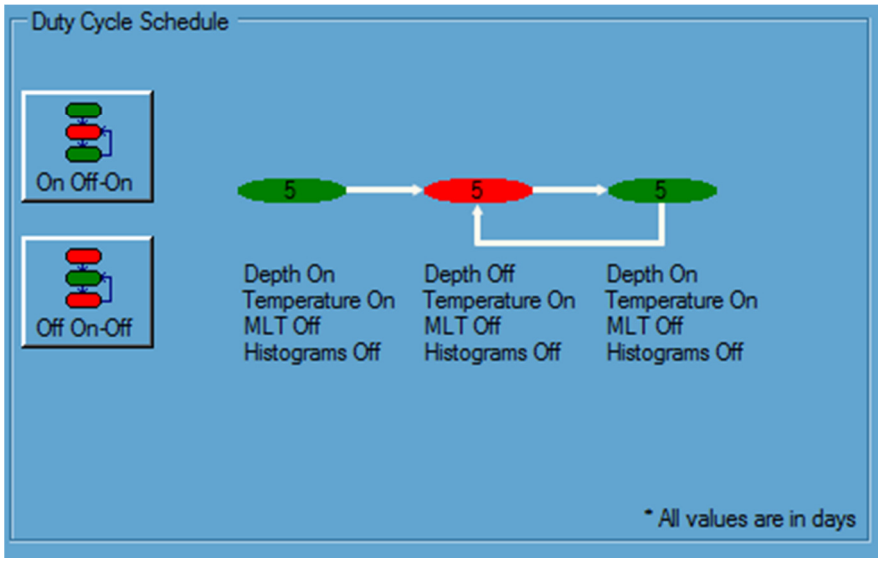
Summary Messages

In addition to Time-Series messages MiniPATs tags can transmit the following types of information.

- **MLT Messages:** Mixed Layer Transmissions can be set to always transmit, disabled, or duty cycled. Mixed layer Argos messages contain the following information for each summary period:
    - Time in the mixed layer (percent)
    - Depth of mixed layer (max)
    - Temperature of mixed layer (min, max, avg)
    - Temperature of the sea surface (min, max, avg)
    - Overall depth (min, max)
    - Overall temperature (min)
- **Histogram Messages:** Histograms can be set to always transmit, disabled, or duty cycled. Argos histogram message will include two types of histograms. Time-at-Depth (TAD) histograms bundle the depth sensor measurements into bins based on how much time the tag was at the user-defined depth ranges. Time-at Temperature (TAT) histograms bundle the temperature sensor measurements into bins based on how much time the tag was at user-defined temperatures. Histograms are generated starting at 00:00 UTC for a 24 hour summary period, and at 00:00, 06:00, 12:00, and 18:00 UTC for a 6 hour summary period.
- **PDT Messages:** Profile of Depth and Temperature messages must be set to always transmit. This cannot be changed. PDTs record the minimum and maximum temperatures observed at different depths. 8 different depths are used when the dives during this summary period were less than 400m. 16 different depths are used when dives exceed 400m. The 8 or 16 depths are equally spaced between the minimum and maximum depths observed during each summary period.
- **Light-Level Geolocation Messages:** Light level messages must always be sent. This cannot be changed. Dawn and dusk transitions are used to calculate geo-locations (see the WC-GPE tools on the Downloads page of our website). Two light-level messages are created for each day of the deployment containing the following information:
    - Whether or not the message contains a dawn or dusk transition
    - Nine light-level and depth samples taken during each transition
    - A sea surface temperature for each transition. This is compiled from the samples taken up to seven hours on the dark side and one hour on the light side of the transition
- **Summary Period:** This period defines the collecting duration for all depth-temperature profiles (PDT), mixed layer temperatures (MLT), time-at-depth histograms (TAD) and time-at-temperature histograms (TAT) sent through Argos.

Bin Limits: There are twelve bin limits for each of the two histograms. These numbers are the upper inclusive limit for each bin. The limits in the eleven white boxes can be edited. The grey box for the twelfth bin limit shows the highest valid sensor measurement. Clicking on the Enter key will sort your new entries into ascending order.

Duty Cycle Schedule



Argos message generation can be duty cycled. This will reduce the total number of messages generated and increase the chances of getting a complete dataset. This is useful when the finite battery power of the tag would likely truncate the data record transmitted via Argos. This may happen when many data products are enabled or the sampling period is small. A detailed discussion of the factors affecting the number of Argos messages created and transmitted can be found below in "Total Argos Messages Created."

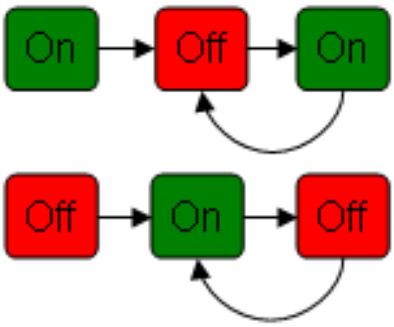
The following data types can be transmitted according to a user defined duty cycle:

- Time Series Depth Messages
- Time Series Temperature Messages
- MLT Messages
- Histogram Messages

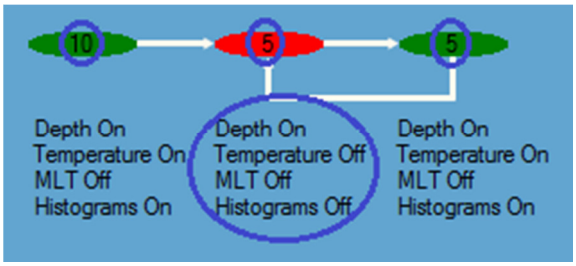
The 4 message types listed above can be independently set to Never Transmit, Always Transmit, Duty Cycle, or Inverse Duty cycle.

Whenever Duty Cycle is selected for a product, the Duty Cycle Schedule settings become active as shown above. Two patterns are available and selected with the buttons on the left. They slect how the tag should behave when first deployed:

1. Initially ON for 'x' days, then OFF for 'y' days, then ON for 'z' days. After 'x' days, it will cycle between 'y' and 'z' for the remainder of the deployment.
2. Initially OFF for 'x' days, then ON for 'y' days, then OFF for 'z' days. After 'x' days, it will cycle between 'y' and 'z' for the remainder of the deployment.



The data products enabled for on-days and off-days are shown once the on-off scheme is selected. The number of days in each state can be changed by highlighting or selecting the current value and entering a new value.



The above settings will cause the tag to create Argos messages as follows:

1) Days 1 – 10: Depth and temperature time series, histograms, geolocation, and PDTs.
2) Days 11 – 15: Depth time series, geolocation, and PDTs.
3) Days 16 – 20: Depth and temperature time series, histograms, geolocation, and PDTs.
4) Days 21 – 25: Depth time series, geolocation, and PDTs.
5) Days 26 – 30: Depth and temperature time series, histograms, geolocation, and PDTs.
6) And so on…

Note that geolocation and PDT messages are always created and cannot be turned off or duty cycled. Also note that the first state can have the same duration as the equivalent repeated state (initial "on" and subsequent "on" states, or initial "off" and subsequent "off" states). This sets up the tag to behave as if there was no unique first state on deployment.

Total Argos Messages Created

Many settings on the tag affect the total number of Argos messages generated by a complete deployment (to the release date). These are:

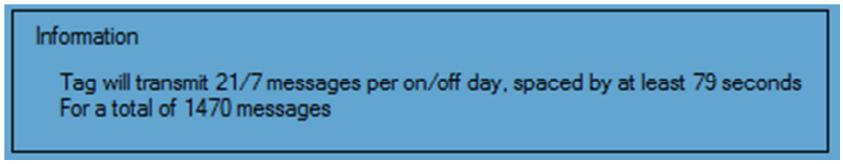
- Enabled data products

- Duty cycling of enabled products
- Sampling Interval
- Summary Period
- Release Date

These settings affect the number of successfully-received messages that can be expected at the end of the deployment when the tag transmits the summarized archive. The number of successful messages can vary from [x to y] depending on sea surface conditions, satellite coverage, battery capacity, length of deployment, and background radio interference. If, as an example, a conservative number of [z] successful messages is assumed, and if the study's objectives require a fairly complete time-series, then the settings listed above should be set so that no more than [z] messages are required to send a complete time-series.

For example, selecting a short (75-second) Time-Series Sampling Interval rapidly generates messages. This might be acceptable for a short deployment. However if too many messages are generated too quickly, the tag will be unable to transmit all of them. The result will be random gaps of time during the deployment for which there is no time-series data. Selecting a longer Sampling Interval so that fewer than [z] messages are needed to transmit the Time-Series will improve the odds that there will be no gaps in your Time-Series data set. However, the temporal resolution of each datum will be reduced. Different study objectives will warrant different trade-offs between coverage and temporal resolution.

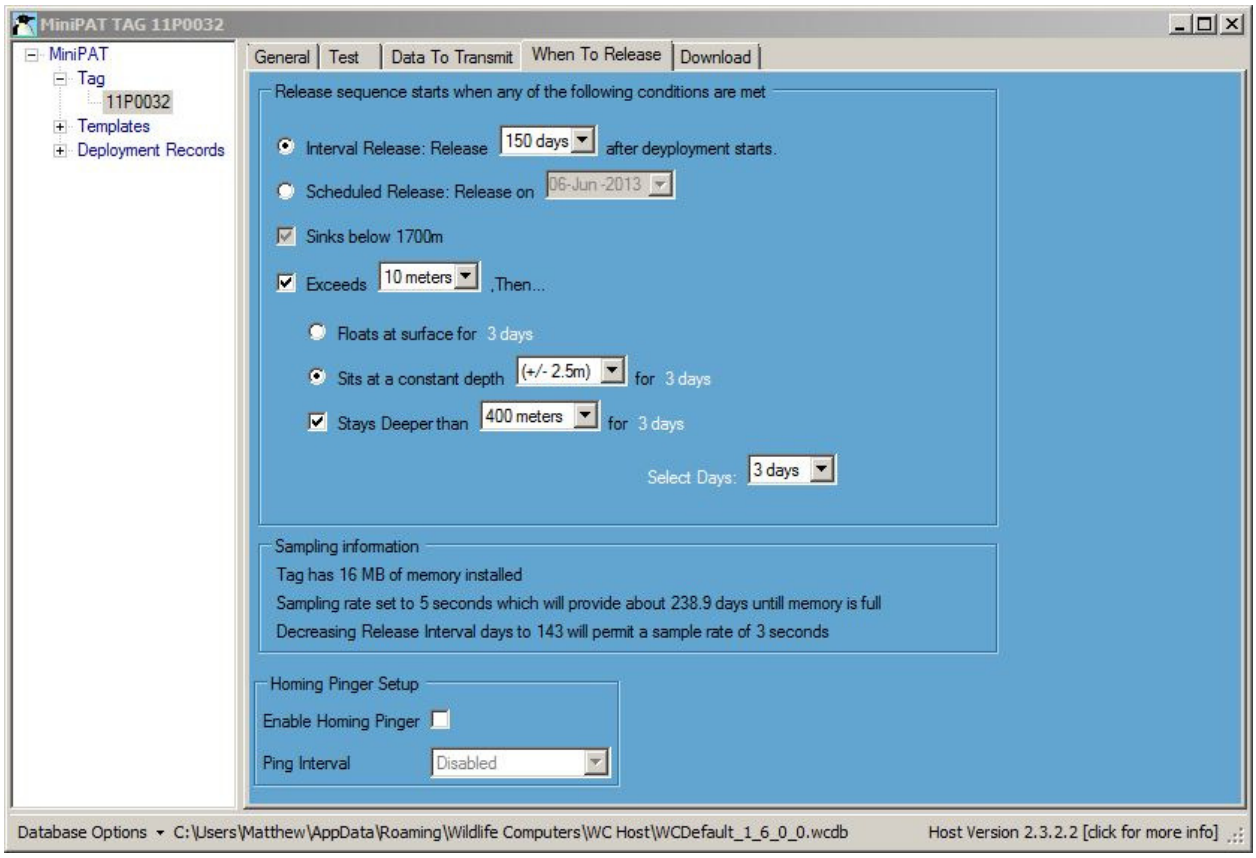
The combined effect of the chosen settings is shown in the **Information** box at the top right on the Data To Transmit tab:



This box contains the total number of messages that will be created for the deployment, assuming the tag collects data until the release date. Two values are displayed for the number of messages per day: messages per on-day/messages per off-day. On-day messages include the number of messages generated each day for data products that are always created and data products enabled by duty-cycling. Off-day messages only include messages generated by data products set to "Always Transmit". For example, in the above message, 21 messages per day will be created for on-duty days and 7 messages per day will be created for off-duty days. A warning is displayed when the message total exceeds the maximum likely to be successfully received.

One can enable high-resolution data products, have many data products enabled, or increase the deployment time by sacrificing complete coverage of the deployment period. Duty cycling (described above) causes the generated messages to be created in a repeating pattern from the archived data, reducing the total number of messages generated.

When To Release Tab


MiniPAT TAG 11P0032
MiniPAT
Tag
11P0032
Templates
Deployment Records
General
Test
Data To Transmit
When To Release
Download
Release sequence starts when any of the following conditions are met
Interval Release: Release 150 days after deployment starts.
Scheduled Release: Release on 06-Jun-2013
Sinks below 1700m
Exceeds 10 meters ,Then...
Floats at surface for 3 days
Sits at a constant depth (+/- 2.5m) for 3 days
Stays Deeper than 400 meters for 3 days
Select Days: 3 days
Sampling information
Tag has 16 MB of memory installed
Sampling rate set to 5 seconds which will provide about 238.9 days untill memory is full
Decreasing Release Interval days to 143 will permit a sample rate of 3 seconds
Homing Pinger Setup
Enable Homing Pinger
Ping Interval
Disabled
Database Options
C:\Users\Matthew\AppData\Roaming\Wildlife Computers\WC Host\WCDefault_1_6_0_0.wcdb
Host Version 2.3.2.2 [click for more info]

Release Date

MiniPATs will release if one or more of the following conditions are met:

- The release date has arrived
- The tag sinks below 1700 meters
- Configurable depth and time parameters are exceeded
- The release pin broke in the field and the tag is at the surface

- **Interval Release:** The release will occur after the days specified once the deployment starts at 20:00 UTC.
- **Scheduled Release:** The release pin will begin corroding on the date specified at 20:00 UTC. After you set or change the Release Date you should go to the Data To Transmit tab to confirm that the number of messages shown in the Information box in the upper right is still appropriate (see **Sampling Interval** for details).

The text in the Release Date box describes how the software has automatically optimized the archive sampling rate for the deployment length and available memory. The tag will also provide you a release date or time that will allow the next best archive sample interval. This is not the same sample interval. This interval is not the same interval used to generate Time-Series Messages.

Conditional Release Setup

MiniPAT tagware can use sensor measurements to make reasonable assumptions about the state of the deployment. For instance if the study animal dies, the tag will most likely get stuck at the surface or on the bottom. In both cases the depth measurements will be constant. Depending on your study design, you may want the tag to release and begin transmitting if these conditions are met. Careful consideration of how these settings apply to your study can be a critical part of acquiring useful data from your deployment.

- **Sinks below 1700m:** This feature is always active and prevents the tag from being crushed at great depth. When the tag sinks below 1700 meters it will initiate release.
- **Exceeds… Then…:** Checking this box enables various configurable parameters to trigger a conditional release. When checked, the drop down box becomes active to select a depth threshold that must be exceeded before the criteria below are used to initiate a release. For example, if you deploy a tag while it's connected to a PC, the tag will begin detecting a constant depth as you carry the tag around before attaching it to an animal. To avoid triggering a conditional release before a tag is attached to an animal, set this to a depth that you are sure the tag will see soon after it is attached.
    - **Floats at the surface for:** Select this option if you would like the tag to release *only* when floating at the surface.
    - **Sits at a constant depth:** This parameter causes the tag to release if it remains at a constant depth for an extended period of time, including the surface (depth is approximately zero). If you wish the tag to release either at the surface *or* at a constant depth, choose this option. You must also set a range of depths that will be considered to be a constant depth. Be mindful of the maximum tidal range in your study area when setting this parameter. A tag stuck on the bottom will detect some minor depth changes as tides change the water depth. If you choose a range that is too small for local tidal conditions, the tag will not initiate a conditional release when it is stuck or sitting on the bottom.
        - **Stays Deeper than:** Enabling this option will cause the tag to release when below some depth for an extended period. Once checked, the drop down menu will allow you to select the depth. This option is only available when 'Sits at constant depth' is selected.
    - **Select days:** Indicated with white text, this sets how long each of the above depth criteria must be maintained before a release will occur. The pin burn will occur after the specified time has elapsed, not at 20:00 UTC like the scheduled release.

The settings shown in the above screen capture will result in the following:

- The tag will release 150 days after deployment
- The tag will release if it ever exceeds 1700m
- The tag will release if it exceeds 10 meters in depth *and* meets any of the following criteria:
    - Stays within 2.5m of a constant depth for more than 3 days.
    - Stays deeper than 400m for more than 3 days.

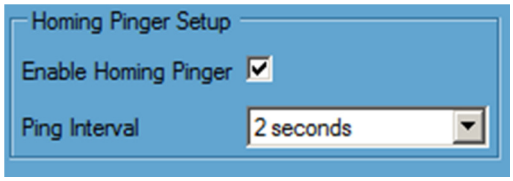
In order to help indicate why a conditional release occurred, Time-Series messages are automatically enabled if a MiniPAT senses an exceptionally short conditional release because there will be plenty of battery capacity to support the transmission of the messages.

If the conditional release is:

- Less than 15 days the MiniPAT will create 300sec Time-Series for depth and temperature (unless the originally programmed interval was faster).
- Between 15 and 30 days, the MiniPAT will create 600sec Time-Series for depth and temperature.
- Greater than 30 days AND no temperature or depth Time-Series were initially enabled, the MiniPAT will create 600sec Time-Series for two days leading up to a conditional release until pin burn completes and tag reaches surface.

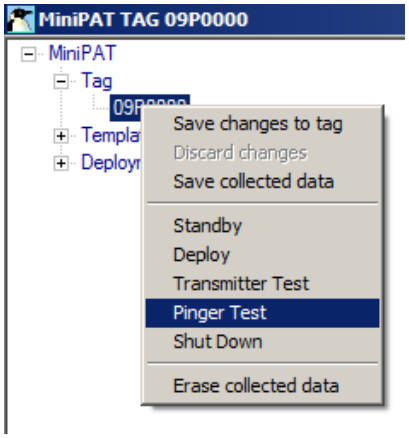
Homing Pinger Setup

The Argos transmitter on the MiniPAT can also be used as a homing pinger. A one-second ping interval is the most appropriate setting, and mimics a typical VHF tracking transmitter. Excess power draw from the pinger is negligible. The transmissions sent by the pinger are very short and do not carry any data. They will not be processed by the Argos system.



With an appropriate receiver and directional antenna, the MiniPAT can be located and recovered after release. The method used is identical to that of traditional VHF tracking. With the MiniPAT tag in-hand, the entire archive will be available for download. Contact Wildlife Computers for a list of appropriate receivers and directional antennas that are compatible with Argos transmissions.

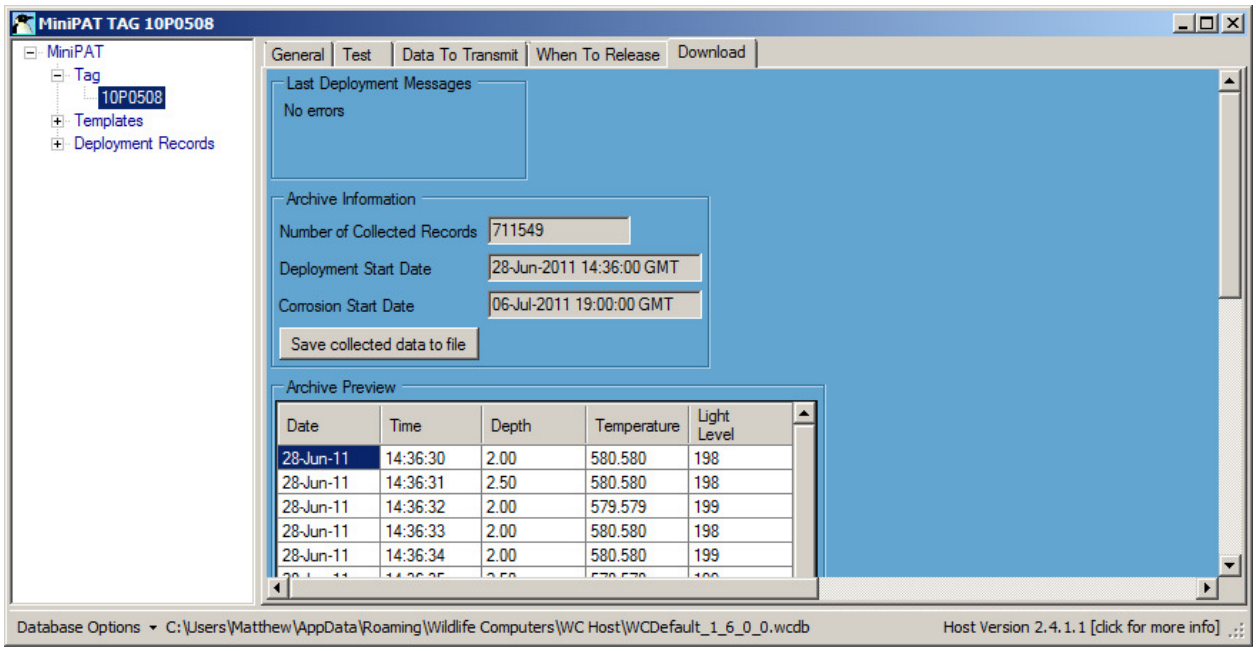
The homing pinger can be tested. Make sure the 'Enable Homing Pinger' box is selected. Right-click the serial number in the Tree View and select 'Pinger Test'. If the pinger is not enabled, you will receive an error message. While running the pinger test, the tag will disconnect from host. The LED on the tag will flash when the ping is transmitted. Once you have completed the test, reconnect the tag to host or reset with a magnet. Note that the tag will *continue pinging* until reset with a magnet or reconnected with host.



Copying set-up parameters from one MiniPAT to another

If you plan to use the same parameters in several tags, you will want to use a template. See instructions under File Types in the Saving Data and Settings section of the manual.

Download Tab



Last Deployment

- **Errors:** This box displays events from the previous deployment. Errors displayed here may include instances of a battery voltage that dipped too low, unexpected electronic events, or deployments where the maximum number of Argos messages was transmitted.

Archive Information

- **Number of Collected Records:** If a tag has been deployed, this box will display the number of sensor sampling records that were collected. This box will display 0 for a tag that has an erased archive. To erase an archive, right-click the tag in the Tree View and select "Erase collected data." This operation will take about a minute to complete.
- **Deployment Start Date:** Tags that have not yet been deployed will display 01-Jan-2000 00:00:00 GMT. Tags that have been deployed will display the start time and date for the deployment.
- **Corrosion Start Date:** Tags that have not yet been deployed and/or not yet initiated corrosion of the release pin will display 01-Jan-2000 00:00:00 GMT. Tags that have been deployed and corroded will display the start time and date for corrosion of the release pin.
- **Save collected data to file:** Click this to save a copy of the archive as a .wch file. A .wch file saves all of the tags settings and collected data. This file type is used by the WC-DAP analysis tools available on our website. See the **Saving Data and Settings** section for details on other file types associated with MiniPATs. Settings on the tag cannot be changed until the data are downloaded.

Archive Preview

Tags that have not yet been deployed will display "No archive data available." Tags that have been deployed will display a table of the first sensor readings including the date and time the sample was taken, depth, external temperature and light.

Logging off MiniPAT and exiting Host

Creating a MiniPAT Deployment Record

It is important to archive the configuration of the MiniPAT (versions, parameters) prior to deployment so that they can be used for correctly analyzing the data. When disconnecting from the MiniPAT, regardless of which mode it is in, MiniPAT Host will prompt you and give an opportunity to create a deployment record. *We strongly recommend creating a deployment record whenever you have changed and saved parameters on the tag.*

Disconnecting from the MiniPAT

There are 3 modes to choose from when disconnecting from the MiniPAT: Standby, Deploy, and Shutdown.

Warning: You should *never* disconnect a MiniPAT from a USB-Blue without selecting Standby, Deploy or Shutdown mode. Doing so may leave your MiniPAT in a mode that will rapidly deplete its internal battery.

Standby mode

In this mode the MiniPAT is not entirely "turned off," but it monitors the wet/dry sensor for a signal to change it to Deploy mode. If the wet/dry sensor senses a pre-set minimum change in conductivity (immersion in saltwater) the MiniPAT will change to deploy mode.

Deploy mode

This mode automatically updates the tag (if parameters have changed) and erases memory.

- If you are connected to the tag and communicating with MiniPAT Host, you will get a warning prior to memory being erased. You may cancel if you did not intend to clear memory.
- If your tag enters the Deploy mode while not connected to MiniPAT Host, you will not get an opportunity to save your data before memory is erased.

In Deploy mode, the tag initializes and immediately begins to sample. For the first two hours of a deployment (or until the tag depth exceeds 5 meters) the tag will briefly blink at the sampling interval.

After 5 days of deployment, a magnet swipe will put the MiniPAT into Shut Down mode. The tag must be connected to a PC running MiniPAT Host in order to change the mode. This is to avoid unintentional data erasure.

When you select Deploy mode while connected to MiniPAT Host, a Deployment Record file may be created if you choose. You will be prompted to do this. The Deployment Record as a filename of DR_serialnumber. It is saved into the database. The filename may be changed by right-clicking on it in Tree View.

Shutdown mode

Use this mode for storage between deployments. You must re-establish communications to deploy the tag or put it into Standby mode. The clock and data in memory are maintained.

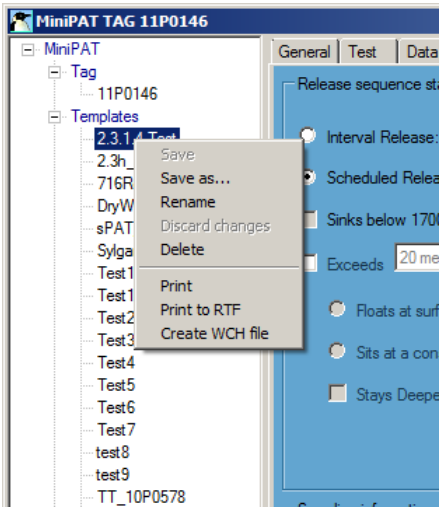
Clearing the MiniPAT's memory

The memory may be cleared manually by right clicking on the serial number in the Tree View and selecting the Erase Collected Data option.

The memory will also be cleared automatically if you exit in Deploy or Standby mode. The LED will indicate that the tag is clearing the archive in preparation for a new deployment. This is confirmed when the LED is mostly on with rapid blinking.

Saving data and settings

Using the Tree View



Items in the Tree View can be manipulated by right-clicking to bring up menus, or by dragging and dropping items with a mouse.

Left-clicking a folder displays a help screen for using the Tree View to program tags and organize files.

You can create and organize folders in the Tree View using right-click menus and dragging items to new locations.

File Types

There are three types of files associated with MiniPATs:

- **.wch Files**: .Wch files are primarily for saving data from a tag that was recovered after a deployment. All collected data and tag settings are stored in a .wch file. .Wch files are processed by the data analysis programs from our website. See the WC-DAP user manual for details. .Wch files may also be sent to Wildlife Computers for resolving technical issues.
    - .Wch files with collected data can be created from the Download tab ("Save collected data to file") or by right-clicking a tag in the Tree View and choosing an action.
    - Limited .wch files (settings but no collected data) can be created from templates or deployment records by right-clicking those items in the Tree View.
    - .Wch files can be used to transfer tag information between different computers. To import a .wch file right-click on Templates.
- **Templates**: Use Templates when you want to configure multiple MiniPATs with the same settings. You can create templates from an existing tag, a deployment record or from a new blank template. To create a new blank template, right-click Templates in the Tree View and select New Template. Choose settings on the tabs in MiniPAT Host the same way you would when connected to and configuring a tag.

  Templates exist as a record in a database file rather than as a discreet file (see Database section of this manual). You can convert a template into rich text (.rtf) or a .wch file by right-clicking it. Exporting a folder of templates converts each template in that folder into a .wch file. You cannot convert an .rtf or .wch file back into a template.

- **Deployment Records**: Use Deployment Records to preserve a record of how your tags were configured. Every time you disconnect from a tag you will be prompted to save a deployment record. Deployment records can be used like templates to configure new tags the same way as previous tags.

  Deployment records exist as a record in a database file rather than as a discreet file (see Database section of this manual). You can convert a deployment record into an .rtf or .wch file by right-clicking it. Exporting a folder of deployment records converts each deployment record into a .wch file. You cannot convert .wch or .rtf files back into a deployment record.

- **.rtf Files**: Use these files to create a listing of tag settings in a standard readable form. You can create .rtf files from templates or deployment records by right-clicking them in the Tree View. Microsoft Word or text editors will display the contents for viewing.

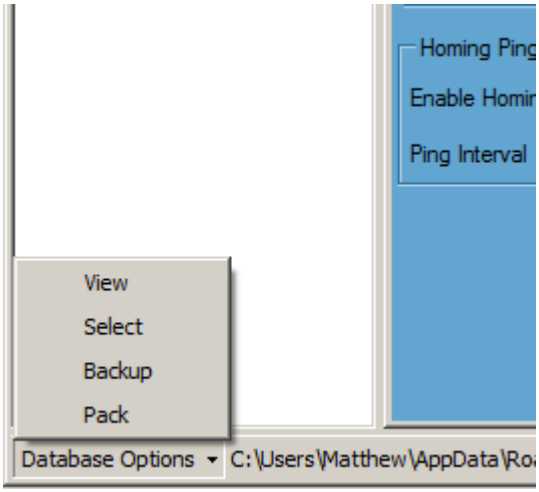
- **Database**: MiniPAT Host automatically creates a database of templates and deployment records. The database is in the .wcdb file shown at the bottom of the screen. The Tree View is populated by the items in this database.

Utilizing database options

MiniPAT Host maintains a database of deployment records and templates.

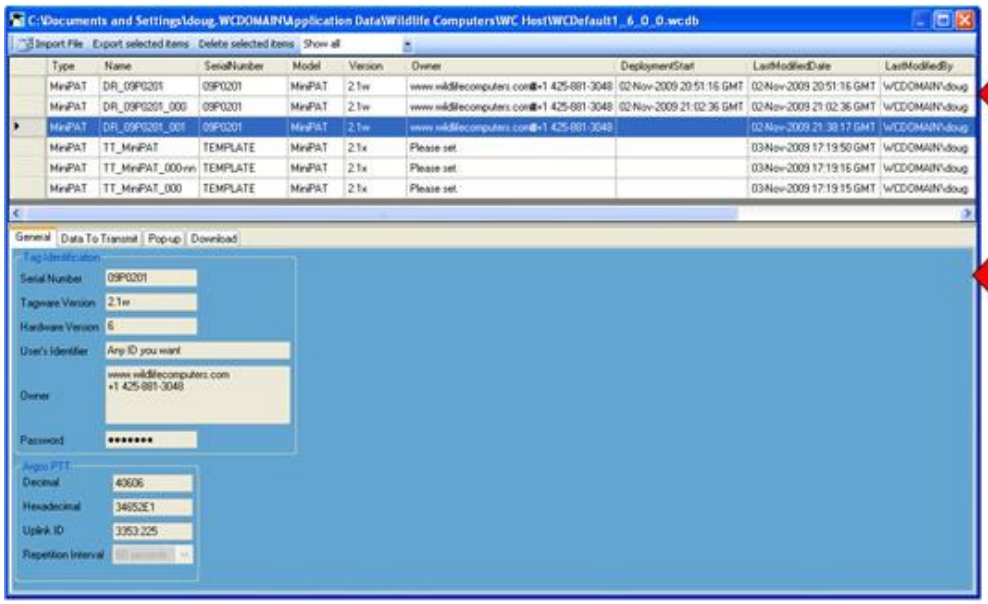
Database Options menu

The database options menu is in the bottom left-hand corner of the window.



- **View**: This opens a new window that displays the database.
- **Select**: This is used to point MiniPAT Host to a different database file. Changing the database file will require re-starting MiniPAT Host. MiniPAT Host will use this file the next time you start Host.
- **Backup:** This creates a duplicate copy of the database file.
- **Pack:** This command defragments and optimizes a large database so Host will run faster. It does not change any of the contents.
- **Load All:** This can be used to ensure that the Tree View is updated with recent changes to the records.

The Database View is a split screen. The upper half shows a list of records in the database. Each row is an item in the database. Choosing a record in the top half of the screen will display its contents in the lower half of the screen.



List of records in the database.

Details of the highlighted record.

Appendix A. Quick Start Guide

This overview describes the general steps followed to utilize Wildlife Computers tags. No tag should be deployed or data downloaded using only this guide. It is strongly suggested that the appropriate documentation for each specific tag type be consulted.

1	2	3	4	5
Set Up Tag	Deploy Tag	Retrieve Argos Messages	Recover Tag	Analyze Data

1 Set Up Tag

Each tag is customized using a personal computer running a host program connected to the tag with a Wildlife Computers USB-Blue cable. Every type of tag has its own host program which is installed from the download page at WildlifeComputers.com. You need to download and install the USB-Blue cable driver before connecting the USB-Blue.
The user manual for your tag is downloaded from the documentation section of the download page at WildlifeComputers.com. Each user manual describes how to customize a tag for your study conditions.

2 Deploy Tag

A deployed tag is collecting data and perhaps transmitting information to satellites. Tags are deployed using a host program, or they can automatically deploy based on conditions such as:

- The wet/dry sensor detects an extended period of wet
- The depth sensor detects an extended period of deep water
- A magnet is passed by the tag in a precise sequence

3 Retrieve Argos Messages (For tags having an Argos transmitter)

You can retrieve data transmitted by a tag using any or all of these means:

- Emails or discs sent directly from Service Argos
- Downloads from www.argos-system.org
- Wildlife Computers Data Analysis Programs (WC-DAP)

See the instructions at www.argos-system.org to learn how to receive your data directly from Service Argos.
Wildlife Computers Data Analysis Programs (WC-DAP) is downloaded from WildlifeComputers.com. WC-DAP contains Argos Message Retriever which runs on your computer and periodically contacts Argos to download your data.

4 Recover Tag

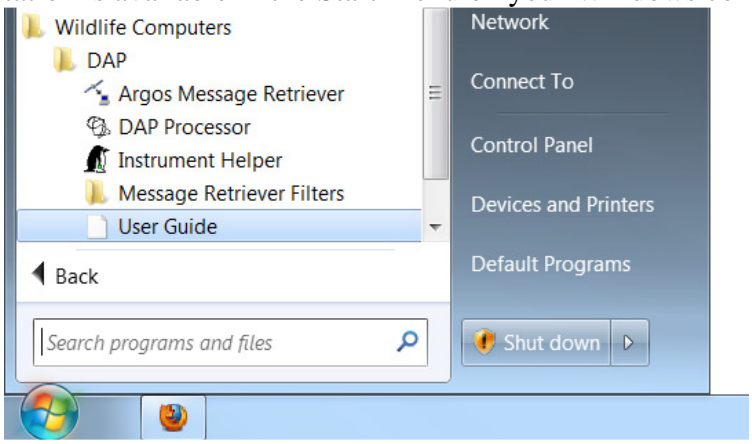
If you physically recover your tag and it contains archived data, the tag contains a more detailed record of samples than was transmitted through Argos satellites. The recorded samples are transferred from the tag to your personal computer using a host program and a USB-Blue cable. Archives downloaded from tags are saved as .wch files and are interpreted by Wildlife Computers Data Analysis Programs (WC-DAP).

5 Analyze Data

Wildlife Computers Data Analysis Programs (WC-DAP) is downloaded from WildlifeComputers.com and contains tools to:

- Geolocate the tag from light level data
- Convert Fast-GPS data into latitude and longitude information
- Decode Argos message data and analyze transmission performance
- Create formatted output such as CSV files, Google Earth maps, WaveMetrics IGOR experiment files

WC-DAP documentation is available in the Start Menu on your Windows computer:

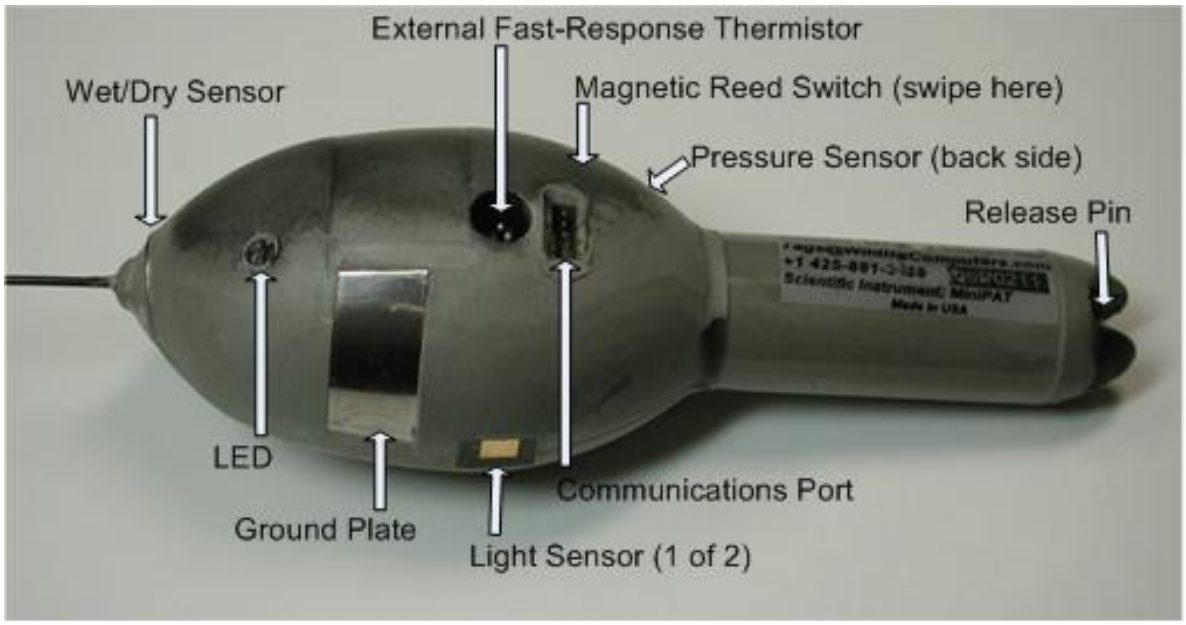


Appendix B. MiniPAT Pop-up Archival Tag

The MiniPAT is designed for deployments on animals that do not regularly come to the surface and for which recovery of the tag is unlikely. This configuration includes the MiniPAT controller, our "Cricket" Argos transmitter, and a corrodible attachment link. The MiniPAT is attached to the animal by a tether through the attachment link. The corrodible attachment link will release the tag from the tether on a pre-programmed release date, or optionally when the MiniPAT determines it is no longer attached to an animal.

In addition to the standard archival functions, depth, temperature and light-level data are collected and summarized for later transmission through the Argos system during the deployment. Transmissions to the Argos satellites occur after the release of the tag from the tether, and while it is floating in the ocean.

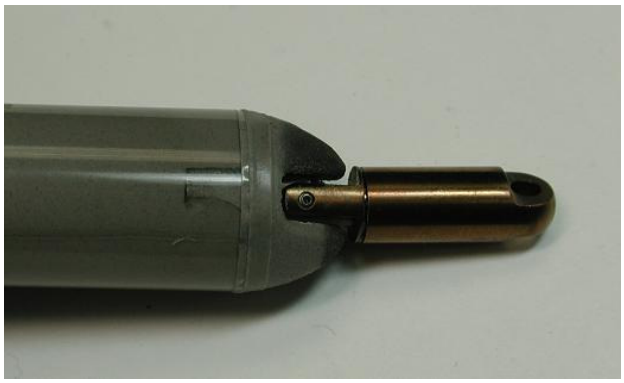
MiniPAT Tag Diagram



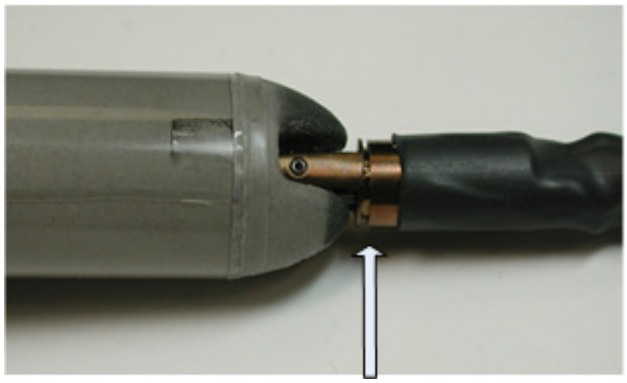
RD1800 Release Device for MiniPAT

Wildlife Computers has developed a mechanical release device, the RD1800, which prevents the MiniPAT from being towed to depths at which it could be crushed. When the RD1800 is exposed to depths exceeding 1800m, water pressure causes an internal pin to be sheared and the tag releases from the animal and leader material. The MiniPAT can then float to the surface.

If this occurs prior to the programmed release date, the Conditional Release feature eventually recognizes a “constant depth” situation and initiates transmission. If Conditional Release was not enabled, the tag will float at the surface until the scheduled release date at which time it will initiate transmissions. (See the section of this manual about the Pop-Up tab for an explanation of Conditional Release.)



The RD1800 shown here is an improved version over the original. It allows a variety of tether materials to be attached to the front of the device.



The swivel and release point must be clear of heatshrink tubing.

The RD1800 release devices are supplied pre-assembled and connected to the MiniPAT tags. For the RD1800 to function correctly it is important that there is no heatshrink tubing or other interference with the release point on the RD1800, as shown here.

Contact information

If you have been unable to find the answer to your question in this manual, our user support staff is available by email, phone or fax during US Pacific Time Zone business hours. Answers to some frequently asked technical support questions, including information related to Argos PTT ID numbers, are available on our website.

Detailed questions which are not time-critical are best addressed by sending an email or fax with the details for staff review. Response will be by email or telephone. However, we are happy to answer more urgent questions on the phone.

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